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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/536,455

05/25/2005

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EXAMINER

FOGARTY, CAITLIN ANNE

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

04/09/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/536,455	Applicant(s) RESIAK ET AL.	
	Examiner CAITLIN FOGARTY	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 March 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10,11,13-15 and 17-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10,11,13-15 and 17-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 13, 2009 has been entered.

Status of Claims

2. Claims 10, 11, 13 – 15, and 17 – 24 are pending where claims 10, 14, 18, 21, and 24 have been amended. Claims 1 – 9, 12, and 16 have been cancelled.

Status of Previous Rejections

3. The 35 U.S.C. 103(a) rejection of claims 10 – 17 and 24 as being unpatentable over Bangaru et al. (US 6,228,183) in view of Heitmann et al. (US 5,554,233) has been maintained.

The 35 U.S.C. 103(a) rejection of claims 18 – 20 as being unpatentable over Heitmann et al. (US 5,554,233) in view of Bangaru et al. (US 6,228,183) has been maintained.

The 35 U.S.C. 103(a) rejection of claims 21 – 23 as being unpatentable over Heitmann et al. (US 5,554,233) in view of the *ASM Handbook* and further in view of Bangaru et al. (US 6,228,183) has been maintained.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 10, 11, 13 – 15, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bangaru et al. (US 6,228,183) in view of Heitmann et al. (US 5,554,233).

With respect to instant claims 10, 14, and 24, col. 1 lines 9 – 16, col. 5 lines 13 – 25 and claims 1 and 2 of Bangaru disclose a steel with an overlapping or close composition as shown in Table 1 below.

Table 1

Element	Instant Claim 10,14,24 (weight %)	Bangaru et al. (weight %)	Overlapping Range (weight%)
C	> 0.10 – 0.15	0.03 – 0.10	close
Nb	0.04 – 0.10	0.01 – 0.10	0.04 – 0.10
B	0.001 – 0.005	0.0005 – 0.0020	0.001 – 0.002
Mo	0.15 – 0.35	0.2 – 0.5	0.2 – 0.35
Mn	1.3 – 2.0	1.6 – 2.1	1.6 – 2.0

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Si	0.15 – 1.30	0 – 0.6	0.15 – 0.6
Al	0.01 – 0.08	0 – 0.06	0.01 – 0.06
N	≤ 0.015	0.001 – 0.006	0.001 – 0.006
Ti	≥ 3.5 x %N	0.005 – 0.03	Meets conditions of claim 1
Fe + impurities	Balance	Balance	Balance
Cu	---	0 – 1.0	0
Ni	---	0 – 1.0	0
V	---	0.01 – 0.10	---
Cr	---	0 – 1.0	0
Ca	---	0 – 0.006	0
REM	---	0 – 0.02	0
Mg	---	0 – 0.006	0

Although the composition of C in the steel disclosed by Bangaru does not overlap with the composition of C in the steel recited in the instant claims, the composition of 0.10 wt% C disclosed by Bangaru is very close in value to the composition of greater than 0.10 wt% C recited in the instant claims and therefore the steel of Bangaru would be expected to have the same properties as the steel of the instant claims. A prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985). See MPEP 2144.05.

In addition, Bangaru teaches that the low-carbon steel alloy can be used to fabricate linepipe which is a mechanical component and therefore the alloy is ready-for-use. They also teach that the steel alloy has a tensile strength of at least about 900 MPa which satisfies the limitation of claims 10 and 14 of a tensile strength greater than 800 MPa. Bangaru also discloses that the steel alloy has a microstructure comprising about 50 vol% to less than 90 vol% fine-grained lower

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bainite, fine-grained lath martensite, or mixtures thereof which satisfies the limitation of claims 10 and 14 that the alloy has essentially bainitic structure.

Claims 10 and 14 are product by process claims and even though product by process claims are limited by and defined by the process, determination of patentability is based on the product itself. See MPEP 2113. Therefore, the process limitations of claims 10 and 14 do not have patentable weight.

Bangaru differs from instant claims 10 and 14 because it does not teach that the steel product is a wire or rod. However in order to obtain the desired shape of a rod, it would have been obvious to one of ordinary skill in the art to use the steel composition of Bangaru in the method of Heitmann for making a rod (see col. 2 line 58-col. 3 line 42 of Heitmann).

Claims 11 and 15 are product by process claims. All of the additional limitations recited in claims 11 and 15 are process limitations and therefore do not have patentable weight as discussed above. See MPEP 2113.

Claims 13 and 17 further limit the composition of molybdenum to ≤ 0.30 wt% and the composition of manganese to < 1.80 wt%. Both of the recited composition limitations still overlap with the compositional ranges disclosed in Bangaru of Mo: 0.2 – 0.5 wt% and Mn :1.6 – 2.1 wt%.

Since the claimed compositional ranges of claims 10, 13, 14, 17, and 24 either overlap, are close, or are within the ranges disclosed by Bangaru, a prima facie case of obviousness exists. See MPEP 2144.05. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed low-carbon steel alloy composition from the steel composition

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disclosed by Bangaru because Bangaru teaches the same utility (i.e. a mechanical component with an essentially bainitic structure) in the whole disclosed range.

7. Claims 18 – 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heitmann et al. (US 5,554,233) in view of Bangaru et al. (US 6,228,183).

With respect to instant claim 18, col. 2 line 55-col. 3 line 42 and col. 7 lines 41 – 67 of Heitmann teach a process for manufacturing a ready-for-use low-carbon steel mechanical component with elevated characteristics exhibiting a tensile strength at break of at least about 827 MPa (see col. 8 lines 9-12) which is within the range recited in instant claim 18. The process comprises starting from a billet (long semi-finished product) and then hot rolling the billet in the austenitic range into a bar. Heitmann refers to the product as a bar, however the bar has a diameter and is therefore in a rod shape and satisfies the limitation of instant claim 18. Then the rod is cooled directly during its hot rolling at a cooling rate sufficient to provide it with an essentially bainitic structure. Finally, the rod is worked by cold plastic deformation into its final shape.

Heitmann differs from instant claim 18 because it does not teach a low-carbon steel component with an overlapping composition with that of the instant claim. However, col. 1 lines 9 – 16, col. 5 lines 13 – 25 and claims 1 and 2 of Bangaru disclose a low-carbon steel with an overlapping or close composition as shown in Table 2 below.

Table 2

Element	Instant Claim 18 (weight %)	Bangaru et al. (weight %)	Overlapping Range (weight%)
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C	> 0.10 – 0.15	0.03 – 0.10	close
Nb	0.04 – 0.10	0.01 – 0.10	0.04 – 0.10
B	0.001 – 0.005	0.0005 – 0.0020	0.001 – 0.002
Mo	0.15 – 0.35	0.2 – 0.5	0.2 – 0.35
Mn	1.3 – 2.0	1.6 – 2.1	1.6 – 2.0
Si	0.15 – 1.30	0 – 0.6	0.15 – 0.6
Al	0.01 – 0.08	0 – 0.06	0.01 – 0.06
N	≤ 0.015	0.001 – 0.006	0.001 – 0.006
Ti	≥ 3.5 x %N	0.005 – 0.03	Meets conditions of claim 18
Fe + impurities	Balance	Balance	Balance
Cu	---	0 – 1.0	0
Ni	---	0 – 1.0	0
V	---	0.01 – 0.10	---
Cr	---	0 – 1.0	0
Ca	---	0 – 0.006	0
REM	---	0 – 0.02	0
Mg	---	0 – 0.006	0

Although the composition of C in the steel disclosed by Bangaru does not overlap with the composition of C in the steel recited in the instant claim, the composition of 0.10 wt% C disclosed by Bangaru is very close in value to the composition of greater than 0.10 wt% C recited in the instant claim and therefore the steel of Bangaru would be expected to have the same properties as the steel of the instant claim. A prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985). See MPEP 2144.05. It would have been obvious to one of ordinary skill in the art to use the steel composition of Bangaru in the method of Heitmann in order to obtain a desired rod shape rather than a steel plate shape.

In regards to instant claim 19, col. 3 lines 10 – 16 of Heitmann disclose that the removal temperature of the rod after rolling is 780-855°C which is within the recited range of below 1000°C.

Regarding instant claim 20, col. 6 lines 52-62 of Heitmann teach that the cooling rate can be 4-8°C/s which is above the minimum of 1°C/s recited in instant claim 20.

Since the claimed compositional ranges of claim 18 either overlap, are close, or are within the ranges disclosed by Bangaru, a prima facie case of obviousness exists. See MPEP 2144.05. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed low-carbon steel alloy composition from the steel composition disclosed by Bangaru because Bangaru teaches the same utility (i.e. a mechanical component with an essentially bainitic structure) in the whole disclosed range.

8. Claims 21 – 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heitmann et al. (US 5,554,233) in view of the *ASM Handbook* and further in view of Bangaru et al. (US 6,228,183).

With respect to instant claim 21, col. 2 line 55-col. 3 line 42 and col. 7 lines 41 – 67 of Heitmann teach a process for manufacturing a ready-for-use low-carbon steel mechanical component with elevated characteristics exhibiting a tensile strength at break of at least about 827 MPa (see col. 8 lines 9-12) which is within the range recited in instant claim 21. The process comprises starting from a billet (long semi-finished product) and then hot rolling the billet in the austenitic range into a bar. Heitmann refers to the product as a bar, however the

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bar has a diameter and is therefore in a rod shape and satisfies the limitation of instant claim 21. Then the rod is cooled directly during its hot rolling at a cooling rate sufficient to provide it with an essentially bainitic structure. Finally, the rod is worked by cold plastic deformation into its final shape.

Heitmann differs from instant claim 21 because it does not teach the hot-rolled rod is subject to plastic transformation by forging at a temperature of about 1200°C or more to bring it to the final desired shape and then thermally treated by quenching at a cooling rate sufficient to provide it with a bainitic or essentially bainitic structure through to the core. However, the process step of subjecting a hot-rolled rod to forging at a temperature of a maximum of 1290°C to create a final desired shape is well known in the art as evidenced by p. 81 and 218-221 of Volume 14 of the 1988 9th Edition *ASM Handbook*. The *ASM Handbook* also teaches the step of quenching in order to obtain the desired physical properties. Therefore, it would have been obvious to one of ordinary skill in the art to incorporate the method steps of the *ASM Handbook* in the method of Heitmann as an alternative method for creating a desired shape of a low-carbon steel alloy with an essentially bainitic structure and a tensile strength at break of more than 800 MPa.

Heitmann also differs from instant claim 21 because it does not teach a low-carbon steel component with an overlapping composition with that of the instant claim. However, col. 1 lines 9 – 16, col. 5 lines 13 – 25 and claims 1 and 2 of Bangaru disclose a low-carbon steel with an overlapping or close composition as shown in Table 3 below.

Table 3

Element	Instant Claim 21 (weight %)	Bangaru et al. (weight %)	Overlapping Range (weight%)
C	> 0.10 – 0.15	0.03 – 0.10	close
Nb	0.04 – 0.10	0.01 – 0.10	0.04 – 0.10
B	0.001 – 0.005	0.0005 – 0.0020	0.001 – 0.002
Mo	0.15 – 0.35	0.2 – 0.5	0.2 – 0.35
Mn	1.3 – 2.0	1.6 – 2.1	1.6 – 2.0
Si	0.15 – 1.30	0 – 0.6	0.15 – 0.6
Al	0.01 – 0.08	0 – 0.06	0.01 – 0.06
N	≤ 0.015	0.001 – 0.006	0.001 – 0.006
Ti	≥ 3.5 x %N	0.005 – 0.03	Meets conditions of claim 21
Fe + impurities	Balance	Balance	Balance
Cu	---	0 – 1.0	0
Ni	---	0 – 1.0	0
V	---	0.01 – 0.10	---
Cr	---	0 – 1.0	0
Ca	---	0 – 0.006	0
REM	---	0 – 0.02	0
Mg	---	0 – 0.006	0

Although the composition of C in the steel disclosed by Bangaru does not overlap with the composition of C in the steel recited in the instant claim, the composition of 0.10 wt% C disclosed by Bangaru is very close in value to the composition of greater than 0.10 wt% C recited in the instant claim and therefore the steel of Bangaru would be expected to have the same properties as the steel of the instant claim. A prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985). See MPEP 2144.05. It would have been obvious to one of ordinary skill in the art to use the steel composition of Bangaru in the method of Heitmann in

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view of the *ASM Handbook* in order to obtain a desired rod shape rather than a steel plate shape.

In regards to instant claim 22, col. 3 lines 10 – 16 of Heitmann disclose that the removal temperature of the rod after rolling is 780-855°C which is within the recited range of below 1000°C.

Regarding instant claim 23, col. 6 lines 52-62 of Heitmann teach that the cooling rate can be 4-8°C/s which is above the minimum of 1°C/s recited in instant claim 23.

Since the claimed compositional ranges of claim 21 either overlap, are close, or are within the ranges disclosed by Bangaru, a prima facie case of obviousness exists. See MPEP 2144.05. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed low-carbon steel alloy composition from the steel composition disclosed by Bangaru because Bangaru teaches the same utility (i.e. a mechanical component with an essentially bainitic structure) in the whole disclosed range.

Response to Arguments

9. Applicant's arguments filed December 17, 2008 have been fully considered but they are not persuasive.

Arguments are summarized as follows:

- a. The amendments to claims 10, 14, 18, 21, and 24 recite a new range of carbon of greater than 0.10 wt% to less than or equal to 0.15 wt%. This new range is not disclosed by Bangaru because Bangaru teaches a content of C having a maximum value of 0.10 wt%.

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b. Heitmann discloses a compositional range for Mo between 0.01 and 0.10% whereas the instant claimed range for Mo has a minimum value of 0.15%.

c. The *ASM Handbook* merely discloses a forging temperature of 1290°C. Thus, there is no teaching or suggestion of combining the *Handbook* with Bangaru and Heitmann to arrive at the invention according to claim 21.

Examiner's responses are as follows:

a. The disclosed range of C in Bangaru is very close to the recited 0.10 wt% C and a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. There, the Examiner maintains the position set forth in the above 35 U.S.C. 103(a) rejection in absence of evidence that a steel with a C content of greater than 0.10 wt% would have different properties than a steel with a C content of 0.10 wt%.

b. The Examiner admits that Heitmann differs from the instant claims because it does not teach a low-carbon steel component with an overlapping composition with that of the instant claims. Therefore, the Examiner relied on Bangaru which discloses a low-carbon steel with an overlapping or close composition to that of the instant claims. Heitmann was not relied on as prior art that teaches an overlapping composition but rather as prior art that teaches a similar method.

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c. The Examiner maintains the position that it would have been obvious to one of ordinary skill in the art to incorporate the method steps of the *ASM Handbook* in the method of Heitmann as an alternative method for creating a desired shape of a low-carbon steel alloy with essentially bainitic structure and a tensile strength at break of more than 800 MPa.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CAITLIN FOGARTY whose telephone number is (571)270-3589. The examiner can normally be reached on Monday - Friday 8:00 AM - 5:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service

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Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/
Supervisory Patent Examiner, Art
Unit 1793

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